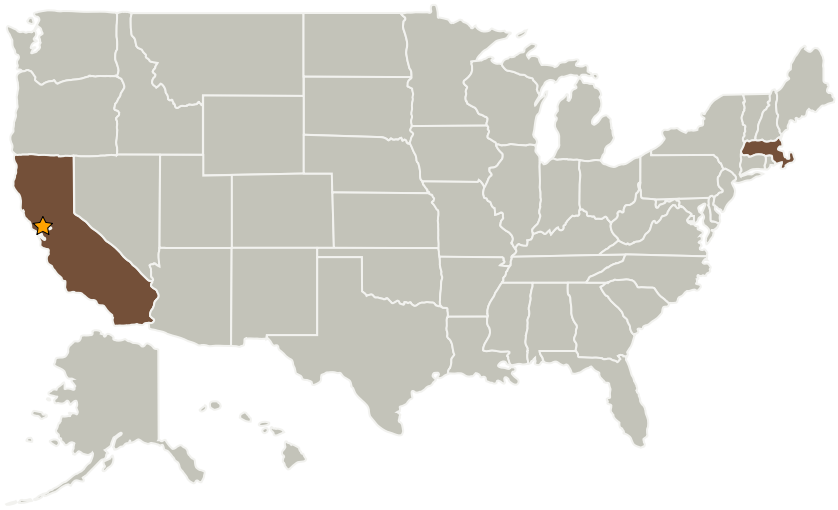
CMOS-Based Neutron Spectroscopic Dosimeter (CNSD), Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Monitoring space radiation and the dose received by astronauts is important, especially for future long-duration missions. Neutrons contribute a significant component to the total radiation dose during solar events. We propose to develop a rugged, compact, lightweight, non-hazardous CMOS-based detector technology for an existing neutron spectroscopic dosimeter system. The existing system utilizes a unique gelled scintillation material, which enables the discrimination of neutron signals from gamma background using time profile of the scintillation signal. We will demonstrate that the ultra-compact CMOS-SSPM integrated with its readout electronics can replace photomultiplier tubes and its discrete readout components used in the existing neutron spectroscopic dosimeter system. When coupled to the existing system, the proposed technology will demonstrate a technology readiness level of 4. This provides the necessary basis for a flight-ready neutron spectrometer system able to efficiently detect neutrons with energies up to 150MeV, and capable of rejecting gamma-ray and charged particle backgrounds using, respectively, the pulse shape discrimination characteristic of the gel scintillation detector and the of anti-coincidence scintillation detectors.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Radiation Monitoring Devices, Inc.	Supporting Organization	Industry	Watertown, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

James Christian

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.5 Monitoring Technology